

RECLAMATION

Managing Water in the West

Draft Stony Gorge Reservoir Fire Management Plan and Environmental Assessment

**Orland Project
Glenn County, California**



**U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Northern California Area Office**

August 2007

MISSION STATEMENTS

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.



**U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Northern California Area Office**

August 2007

**BUREAU OF RECLAMATION
NORTHERN CALIFORNIA AREA OFFICE
STONY GORGE RESERVOIR
FIRE MANAGEMENT PLAN
2007**

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Stony Gorge Reservoir Fire Management Plan 2007

I. Introduction

The Department of the Interior Department Manual (620 DM 1.4B, effective date April 10, 1998), states: "Every area with burnable vegetation must have an approved Fire Management Plan. Fire management plans must be consistent with firefighter and public safety; the identified values to be protected; and land, natural, and cultural resource management plans; and must address public health issues. Fire management plans must also address all potential wildland fire occurrences and include the full range of wildland fire management actions." Fire management plans must identify and integrate all wildland fire management and related activities within the context of approved Resource Management Plans, if possible.

This Fire Management Plan (FMP) is being developed for the Northern California Area Office (NCAO) to guide a range of fire management activities permitted by policy at Stony Gorge Reservoir, Glenn County, California for a 10-year period. Stony Gorge Reservoir does not currently have an approved resource management plan under which this FMP is being developed.

The FMP emphasizes a program using nondiscretionary fire suppression and discretionary prescribed fire activities. The FMP's prescribed fire activities are intended to reduce hazards on the Bureau of Reclamation's Stony Gorge Reservoir lands and to provide resource management benefits, budget dependent. With the completion of the FMP, Stony Gorge Reservoir's fire management program would employ a variety of activities with the assistance of other fire management agencies, or by contract, to accomplish land and resource management objectives and to reduce the risk of unwanted fire in and adjacent to Stony Gorge Reservoir.

Reclamation has followed the 2001 Federal Wildland Fire Management Policy and the January 2001 Secretary of the Interior's policy letter in the preparation of this FMP.

A. Purpose

The FMP is being developed to balance the diverse goals of suppressing wildfires, reducing fire hazards for the public's protection, conducting safe prescribed burns to reduce fuel load and enhance wildlife habitat, enhancing biological diversity, and enhancing sensitive species habitat. The FMP is also being developed to interact with other fire management agencies with firefighting authority by providing them annual operating plans which describe specific contact, restriction, and access information for firefighter safety.

The specific purposes of the FMP are to:

- Reduce the risk of catastrophic wildfire, including the wildland/urban interface (communities and other developed areas), while continuing to mitigate the adverse effects from past fire exclusion policies in fire-dependent ecosystems.
- Execute a fire management program that provides a safe environment for firefighters and the public, including safe operations and fire-suppression-related facilities, e.g., helibases, fire camps, and fire stations.
- Provide a plan that is consistent with the Department and Reclamation's wildland fire management policy and which adheres to the guiding principles from the 2001 Federal Wildland Fire Management Policy, which recognizes that:
 - Firefighter and public safety is the first priority in every fire management activity.
 - Wildland fire is an essential natural process which must be controlled for public safety purposes in this area.
 - Fire management plans, programs, and activities support land and resource management plans and their implementation.
 - Sound risk management is a foundation for all fire management activities.
 - Fire management programs and activities are economically viable, based on values to be protected, costs, and land and resource management objectives.
 - Fire-related plans and activities should be based upon the best available science.
 - Fire management plans and activities incorporate public health and environmental quality considerations.
 - Federal, state, Tribal, local, and interagency coordination and cooperation are essential.
 - Standardization of policies and procedures with other agencies is an ongoing objective.
- Identify and implement methods to restore and maintain Stony Gorge Reservoir ecosystems and ecosystem processes, which in the past have depended upon wildland fire as a natural rejuvenating influence.

With the completion of the FMP, Stony Gorge Reservoir's fire management program could employ a variety of activities to accomplish land and resource management objectives and to reduce the risk of unwanted fire in and adjacent to Stony Gorge Reservoir. Depending on the

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area needing attention, different methods or treatments can be used to manage wildfire and to reduce accumulations of hazardous fuels (dead and dry woody material, leaves, and invasive species). Under fire management, lightning-caused fires and other unwanted fires will be suppressed, and prescribed fires may be planned by Reclamation managers.

Policies for dealing with all prescribed fires and wildfires (including lighting-ignited and accidental fires) will provide information about control methods, necessary safety equipment, crew training, fire breaks, and fuels management and will include archiving fire data that will be useful in future amendments to this FMP.

B. Relationship to Environmental Compliance

Effects of implementing the FMP and fire suppression will be described in an Environmental Assessment with appropriate public involvement. Individual prescribed burns will be conducted under approved burn plans which are categorically excluded under 516 DM 2, Appendix 1.12 from further National Environmental Policy Act analysis. Burn plans will be prepared by qualified personnel or contractors in conformance with current Federal burn plan templates.

C. Agreements

The following agreements provide for initial attack fire protection (mutual aid) for Federal lands within state direct protection areas (DPA) and for recognition of CAL FIRE qualifications to conduct prescribed fire operations on Federal lands in California.

- Multi-Agency Cooperative Fire Protection Agreement (Appendix 1).
- Multi-Agency Agreement for the Cooperative Use of Prescribed Fire; Contract No. 8CA02011 (Appendix 2).
- Cooperative agreement between Reclamation and CAL FIRE No. 06-FC-20-4050 expires September 30, 2008, and was continued from previous agreements for the purpose of reimbursing the state for expenses incurred in suppressing fires on Reclamation land; previous agreements include No. 02-FC-20-0079 (2002-2005), 99FC201769 (1999-2001), 8-FC-20-06380 (1988-1997), 0-07-20-X0123 (1979-1987).

D. Authorities

This plan is implemented under authorities of the:

- Reclamation Act of June 17, 1902 (32 Stat. 388, 43 U.S.C. 391) and acts amendatory thereof and supplementary thereto.
- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C. 594).
- Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. 1535).
- Soil and Moisture Conservation Act of 1935 (49 Stat 163, 16 U.S.C. 590 et seq.).
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. 1856a).
- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121).
- Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C. 2201).
- Federal Grant and Cooperative Agreement Act of 1977 (P.L. 95-224), as amended by P.L. 97-258, September 13, 1982 (96 Stat. 1003; 31 U.S.C. 6301 thru 6308).
- Wildfire Suppression Assistance Act of 1989 (P.L. 100-428, as amended by P.L. 101-11, April 7, 1989).
- Healthy Forests Restoration Act of 2003, December 3, 2003 (P.L. 108-148).
- Energy and Water Development Appropriations Act, September 30, 2006 (P.L. 109-103).
- Departmental Manual 620 DM 1, Wildland Fire Management, General Policy and Procedures.
- Departmental Manual 620 DM 3, Burned Area Emergency Stabilization and Rehabilitation.

E. Description of Area

Stony Gorge Reservoir is located in Glenn County on the west side of the Sacramento Valley, approximately 23 miles west of Willows, CA, via State Route 162. Reclamation manages 2,539 acres of the Stony Creek watershed as part of the Orland Project/Stony Gorge Dam and Reservoir (see Figure 1). The legal description is: T20N 6W S14,15,21,22,27,28,33,34; T19N 6W S3,10 MDPM.

According to the 1974 Recreation and Wildlife Summary Form 7-1643, approximately 1,275 acres comprise the water surface and 1,264 acres comprise the lands area, including the operations area of approximately 103 acres. However, when the land acreage was digitized, it amounted to a total of 1,191 acres, which is the acreage that will be used in this FMP. Approximately 150 acres of the 1,191 acres of Reclamation lands are used for recreation, with the remaining 1,061 acres used for project operations, cattle grazing, and upland wildlife habitat.

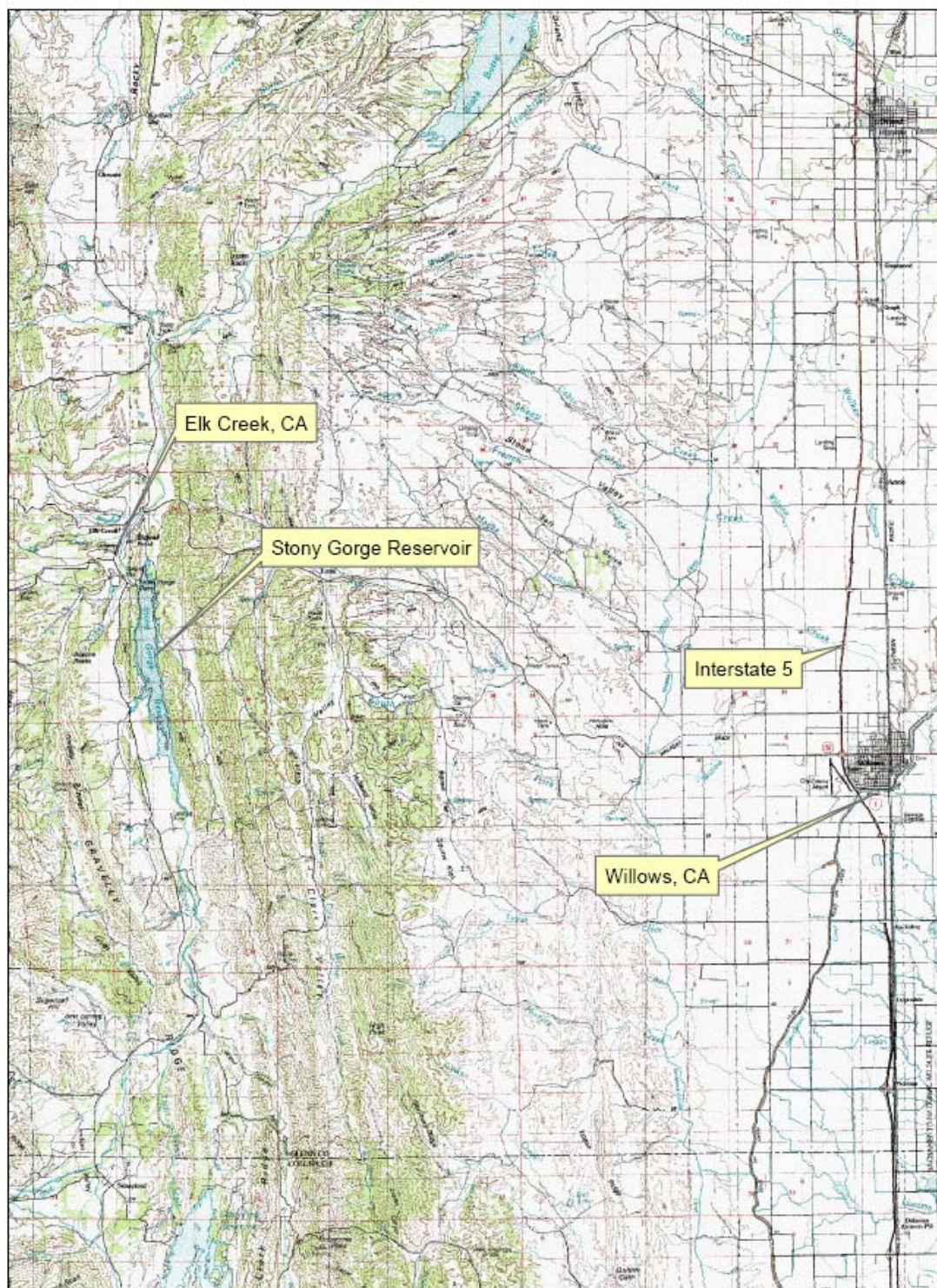
Originally authorized by Congress under the Reclamation Act of 1902, Stony Gorge Dam was constructed in 1928. The reservoir and surrounding area are located near the town of Elk Creek to the northwest, along with other residential developments and area ranches.

Temperature data from 2006 describes an average annual rainfall of 23.24 inches and an average high temperature of 90.4 degrees from June through September (CDEC, 2006).

	Average	High	Low
PRECIPITATION, in.	8-25 (annual) 23.24 in 2006	5.65 (April)	0.00 (July)
TEMPERATURE, °F	90.4 average high (June-Sep)	107 (June 25, July 17)	42 (March 12)

The lands surrounding Stony Gorge Reservoir can be described as containing two habitat communities: oak woodland (blue oak, interior live oak, gray pine) and grassland/chamise chaparral. The oak-chaparral environment within this area can be highly combustible under certain dry conditions, and the risk of wildland fires is a concern to the adjoining community and recreational visitors. Because of this concern, the management agreement with CAL FIRE for wildfire suppression is current and Reclamation is developing this comprehensive FMP for the Orland Project lands at Stony Gorge. Since 1979, Reclamation has held agreements with CAL FIRE to suppress wildland fires on Reclamation lands. The CAL FIRE recorded fire history of the Stony Gorge area can be seen in Appendix 3.

This plan will address future fire management concerns for both fire suppression and the use of prescribed burns to reduce the risk of wildland fires, while enhancing the habitat of designated wildlife species and controlling invasive weeds.



Area Map

Figure 1

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II. Relationship to Land Management Planning/Fire Policy

Reclamation's fire policy follows the Federal Wildland Fire Management Policy and Program Review, which was chartered in 1994 by the Secretaries of the Interior and Agriculture to ensure that Federal policies are uniform and programs are cooperative and cohesive. The resulting 2001 report presents fundamental principles of fire management and recommends a set of Federal wildland fire policies. Though the different missions of the agencies sometimes result in differences in operations, a cohesive set of Federal fire policies improves the effectiveness and efficiency of fire management and our ability to meet modern challenges posed by seasonal wildland fire conditions.

Some of the key points in the policy include:

- Protection of human life is the first priority in wildland fire management. Once firefighters are committed to an incident, their well-being is the number one priority. Property and resource values are the second priority, with management decisions based on values to be protected.
- Where wildland fire cannot be safely reintroduced because of hazardous fuel buildups, some form of pretreatment must be considered, particularly in wildland/urban interface areas.
- The role of Federal agencies in the wildland/urban interface includes wildland firefighting, hazard fuels reduction, cooperative fire prevention and education programs, and technical assistance. Primary responsibility rests at the state and local levels.
- The Western Governors' Association will serve as a catalyst to involve state and local agencies and private stakeholders in achieving a cooperative approach to fire prevention and protection in the wildland/urban interface.
- Wildland fire, as a critical natural process, must be reintroduced into the ecosystem. Fire will be allowed to function as nearly as possible in its natural role to achieve the long-term goals of ecosystem health.
- Wildland fire management decisions and resource management decisions go hand in hand and are based on approved fire management and land and resource management plans. Fire (resource) managers also have the ability to choose from the full spectrum of fire management options, from prompt suppression to allowing fire to function in its natural ecological role.
- Structural fire protection in the wildland/urban interface is the responsibility of Tribal, state, and local governments.
- Federal agencies must place more emphasis on educating internal and external audiences about how and why we use and manage wildland fire.

III. Wildland Fire Management Strategies

A. General Management Considerations

The objective of the FMP is to develop an integrated program focusing on wildfire suppression to protect the public and Government facilities, with consideration of prescribed fire to benefit the ecosystem and manage of fuel load. Fire management activities must be developed in cooperation with adjacent Government agencies and must be designed to avoid economic losses to adjacent landowners. Stony Gorge has adopted a policy of full suppression of all wildfires. Prescribed fire and mechanical treatments may be used for habitat enhancement, weed control, and the reduction of hazardous fuels.

B. Wildland Fire Management Goals

The Stony Gorge FMP is needed because:

- Refinements to the fire management program are needed that will promote ecosystem sustainability.
- Adjacent communities, cultural resources, i.e., historic structures, campgrounds, and other developments at Stony Gorge need protection from unwanted, high-intensity wildland fires. Fire treatments and pretreatments, e.g., prescribed fire, mechanical thinning of understory vegetation, pile burning, chipping, will reduce the risk of catastrophic wildfire and ensuing property loss and begin to reverse the fuel accumulation and ecosystem changes that have created these risks.
- Prescribed fire can help restore and maintain cultural and traditional landscapes valued by visitors and descendants of culturally-associated Native Americans.
- Management of wildland fires, prescribed burning, and fuel reduction treatments require up-to-date planning and preparation.
- Fire management activities require collaboration with Federal, state, county, Tribal, and local agencies, and a fire management plan provides a basis for communication, coordination, and project planning with partner agencies.
- Stony Gorge must comply with the 2001 Federal Fire Policy and insure that no prescribed burns will be conducted on Reclamation land without approved burn plans and that only trained and qualified personnel will conduct fire management activities.
- Safety is paramount to all fire management operations.

C. Wildland Fire Management Options

1. Wildland Fire Suppression

a. Early History

The Patwin Indians, which lived in this area prior to European settlement, like many other California native groups, used fire to facilitate hunting and to entice game (via the fresh green shoots that followed a burn). Intentional fire stimulated the growth of important native grasses such as blue wild rye (*Elymus glaucus*) that were harvested and roasted for consumption. Fire also helped eradicate pests such as grasshoppers (U.C. Davis, 2005). Indians used “controlled, surface burns on a cycle of one to three years” to improve the ecosystem for their own uses (Williams, 1994).

Stony Gorge Reservoir lands contain predominantly chaparral/oak woodland habitat. Chaparral mountainsides were avoided by early peoples, though they were exploited for hunting. A number of the early Spanish explorers noted the extent of smoke and fires in chaparral mountains. They commented that certain Native American groups set the hillsides on fire to aid them in a hunt or to encourage nutritious new growth, both for their favored game species and for their own direct consumption. A Spanish governor, de Arrillaga, issued a proclamation in 1798 forbidding Native Americans to continue firing the hillsides. There is some evidence that the residents following Indian occupation continued the indigenous practice of fire setting, but for the purpose of increasing cattle forage (Rodrigue, 1993).

b. Fire Planning Unit Fire History

The steady accumulation of fuel is the mechanism by which chaparral creates a condition on which it depends. As a result of this accumulation, the longer the period since a fire, the greater are both the probability and the magnitude of the next fire. In such a fire-dependent vegetation system, residential construction and occupation necessarily expose certain people to the destructive potential of a natural event, which is thereby transformed into a natural hazard or even outright disaster (Rodrigue, 1993). Invasive species such as yellow starthistle (*Centaurea solstitialis*) and medusahead (*Taeniatherum caput-medusae*) provide a high percentage of the ground cover around the reservoir, as well as sagebrush, juniper, and other combustible shrub species.

There has only been one reported fire on or directly adjacent to Stony Gorge Reservoir. This was a 530-acre fire on the west side of the reservoir in 1988. Fuel load has been accumulating on the east side of the reservoir since the early part of the century when fires first started being reported by CAL FIRE. Because of the accumulation of fuel since that time, a wildfire could seriously impact the area.

c. **Suppression/Preparedness Actions**

Stony Gorge Reservoir falls within CAL FIRE's DPA for fire suppression described in the 2001 Cooperative Fire Protection Agreement, which was developed for agencies to assist each other with the suppression of wildland fires using the closest forces concept. The closest forces concept involves dispatching the closest fire suppression resources, regardless of agency affiliation. In this way, agencies are efficiently and cost effectively able to maintain suppression protection of their lands even when they may not have fire stations or other suppression resources close to the fire.

The closest fire station is in Elk Creek at 3288 County Road 308, just west of Stony Gorge Reservoir. Contact information is 530-968-5325.

According to the terms of CAL FIRE's agreement with the Federal wildland agencies in California, fires occurring within an agency's DPA are covered for initial attack action for the first 24 hours. If incident (fire) duration extends beyond 24 hours, CAL FIRE will bill Reclamation for actual suppression and support costs associated with the incident.

Stony Gorge Reservoir's DPA is under the direction of the north division of the CAL FIRE Tehama-Glenn Unit, Battalion 4 (Will Darnall, Battalion Chief in Corning, California (cell phone: 530-200-2514).

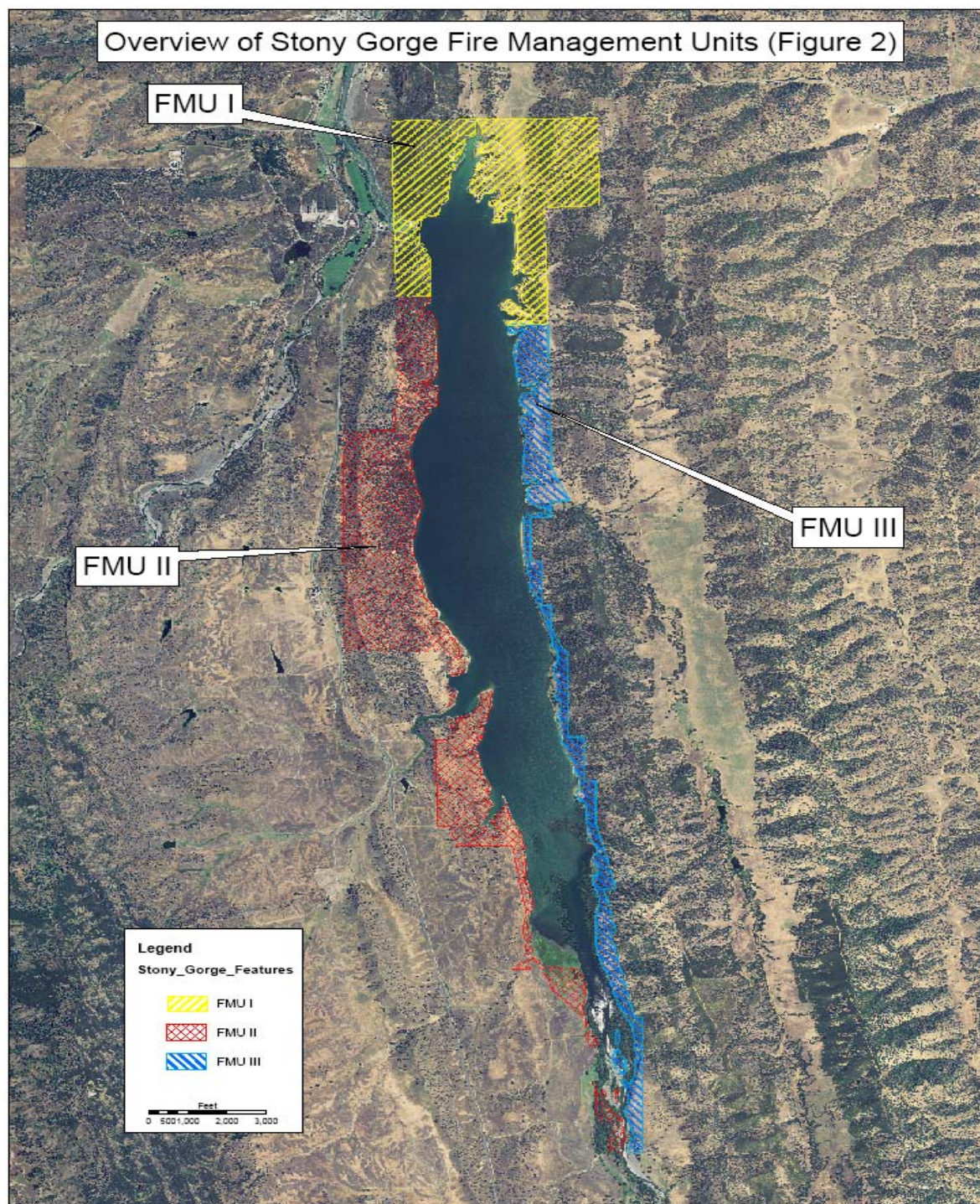
- **Suppression Planning/Operating Plan.** In order to guide the suppression tactics used by CAL FIRE in response to fires at Stony Gorge, an annual Operating Plan will be provided to CAL FIRE by Reclamation each year. The Operating Plan is an agreement between CAL FIRE and Reclamation which describes potential risks and constraints to the responding resources. These are things that CAL FIRE needs to be aware of before a fire occurs, such as locations of locked gates, campgrounds, hydrants, underground lines, propane tanks, and structures that contain combustibles such as pesticides, paints, etc. The Operating Plan also identifies sensitive areas such as riparian or wetland areas that would be restricted from heavy equipment use, if possible, locations of eagle nests or other sensitive species, and locations of roads and recreation areas. Current contact information would be provided regarding official contacts for decision making for each agency with current phone numbers, addresses, and e-mail addresses.
- **Suppression Actions.** Should a fire be reported to 911, the call would be put through to the California Highway Patrol (or Glenn County Fire) who would contact the dispatch center in Red Bluff. A determination would be made as to whether the incident rated as a low priority dispatch situation or a high priority dispatch situation. The severity of the dispatch rating would be dependent on time of year, temperature, humidity, wind, etc. A low dispatch


rating would generally result in the dispatch of three engines, one hand crew, a Battalion Chief, and an investigator. A high dispatch rating could result in the dispatch of six engines, two dozers, two air tankers, one helicopter, three hand crews, a Battalion Chief, and an investigator. The equipment would be dispatched from the closest available sources by the Red Bluff CAL FIRE dispatch center. The closest sources would be Elk Creek, Paskenta, and Leesville during the fire season.

Glenn County Fire may also send out their volunteer Willows Fire Department, especially out of fire season. The complexity of the incident command structure would be commensurate with the size, potential, values at risk, and fire behavior of the incident. The CAL FIRE Incident Commander (IC) may request additional resources from the local Mendocino National Forest (Stonyford) or U.S. Fish and Wildlife Service fire crews from the Sacramento National Wildlife Refuge to assist in initial or extended attack, if they are available. The closest sources for engines to Stony Gorge are located at the Elk Creek (Tehama-Glenn Unit) or Leesville (Sonoma-Lake-Napa Unit) stations. The closest hand crews are in the Alder Springs Valley View Camp (Tehama-Glenn Unit), the closest helicopter is in the Tehama-Glenn Unit in Tehama County (near Vina), and the closest air tankers are located in either Redding (Shasta-Trinity Unit) or Chico (Butte Unit). Reclamation would reimburse CAL FIRE for any costs incurred as identified in the cost share agreement.

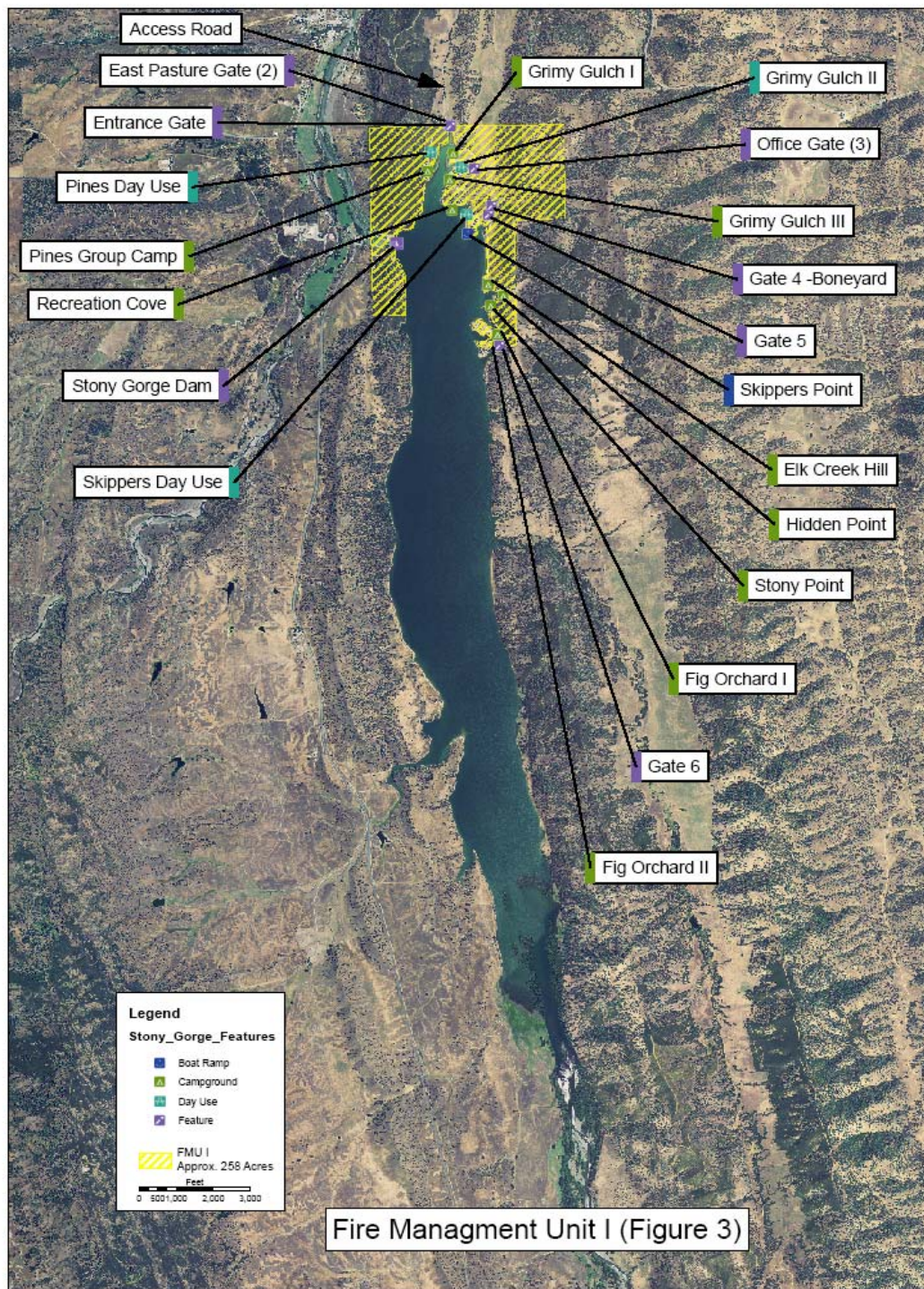
- **Suppression Strategy.** Stony Gorge Reservoir is an area used by the public for recreation and provides habitat for many species of wildlife. The desired strategy is immediate fire suppression of human and naturally-caused fires using minimum impact suppression tactics (MIST). Restrictions on use of heavy equipment in riparian areas (below Stony Gorge Dam and at the south end of the reservoir) and use of retardants in the spring will be acknowledged unless there is imminent threat to human life and property. Heavy equipment in riparian areas will be restricted to protect the habitat and will be used only upon approval by an appointed Resource Advisor on a case-by-case basis. Retardant use should be restricted from February through June, which is the time period of nesting seasons for the bald eagle and other bird species, birthing seasons of deer, and flowering season for sensitive plants.


The Stony Gorge Reservoir lands are divided into three fire management units (FMUs): FMU I (approximately 258 acres), which contains all the campgrounds on the north end of the reservoir and the dam, FMU II (approximately 363 acres), which covers lands on the west side of the reservoir, and FMU III (570 acres), which covers lands on the east side of the reservoir (see Figure 2).



	STONY GORGE RESERVOIR		Sheet:
	FIRE MANAGEMENT PLAN		1 of 1
Filename:	OVERVIEW OF STONY GORGE		Page:
22-214-000047_001_00.pdf	FIRE MANAGEMENT UNITS (FIGURE 2)		Drawing/Map Number:
Date of Creation:	Created/Revised By:	Revision Number/Date:	22-214-47
30-Jul-07	cchambers . NC-245		

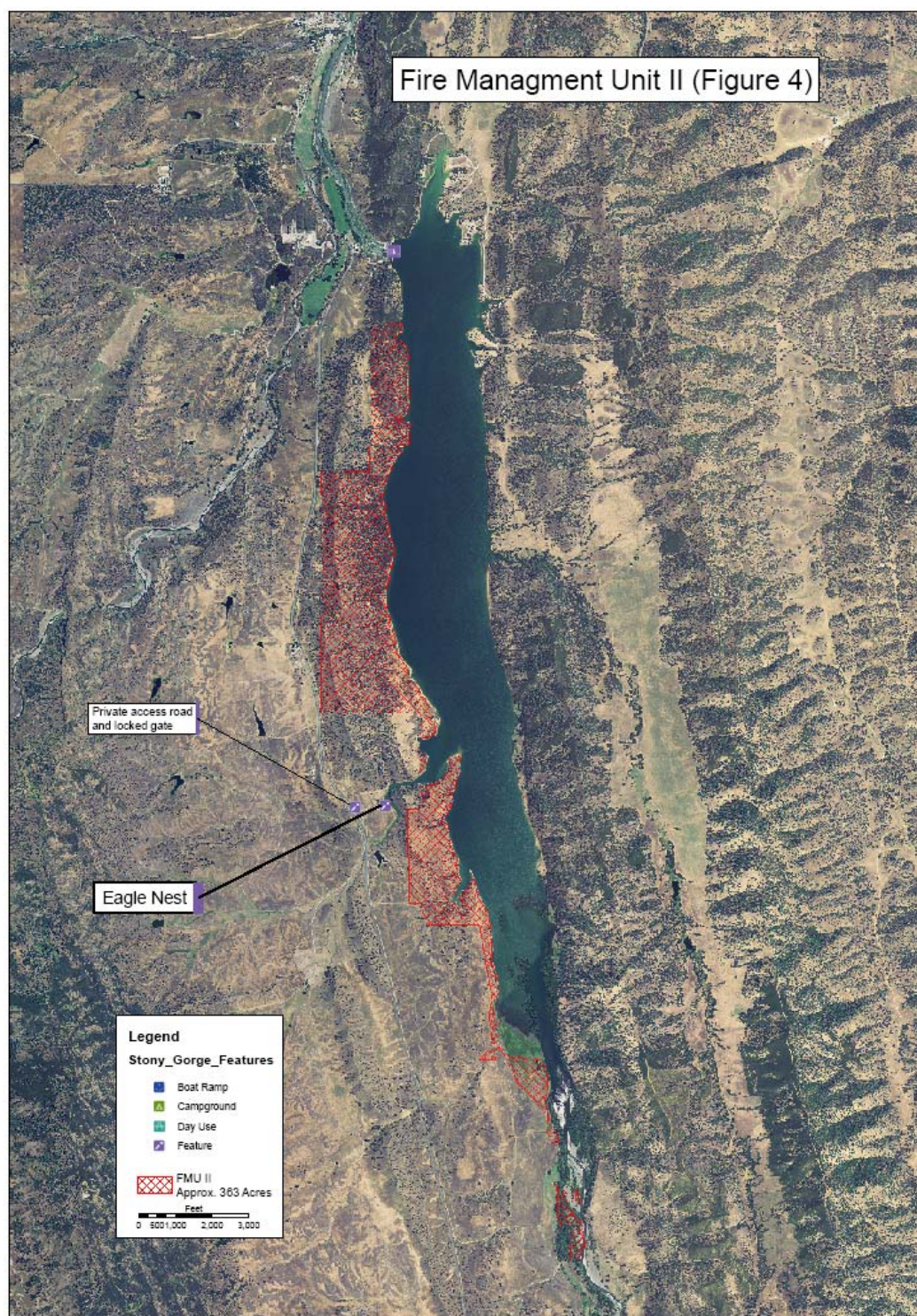
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	STONY GORGE RESERVOIR		Sheet:
	FIRE MANAGEMENT PLAN		2 of 4
Filename:	FIRE MANAGEMENT UNIT I		Page:
22-214-000048_002_00.pdf	BOUNDARY AND FEATURES (FIGURE 3)		
Date of Creation:	Created/Revised By:	Revision Number/Date:	Drawing/Map Number:
30-Jul-07	cchambers. NC-245		22-214-48

Reclamation's fire suppression strategy for FMU I (Figure 3, previous page) is to contain wildfires to 10 acres or less within 24 hours with an aggressive initial attack. This area contains a combination of oak woodland/grassland habitat and invasive species such as yellow starthistle and medusahead, chamise chaparral habitat in the upland area, and a small wetland area at the northernmost end. FMU I is heavily used by the public year-round but especially from April to October. It contains a group campground on the west side, day use areas, campgrounds, and a boat ramp on the east side, and Stony Gorge Dam on the west side. The closest structures are residences below the dam on the west side of the unit adjacent to County Road 306 and the Reclamation office in the middle of the FMU. There is only one road in and out of the area (County Road 304). Due to the limited ingress/egress, public safety is a critical concern should a fire occur when visitors are present. No known listed species occur within this FMU.

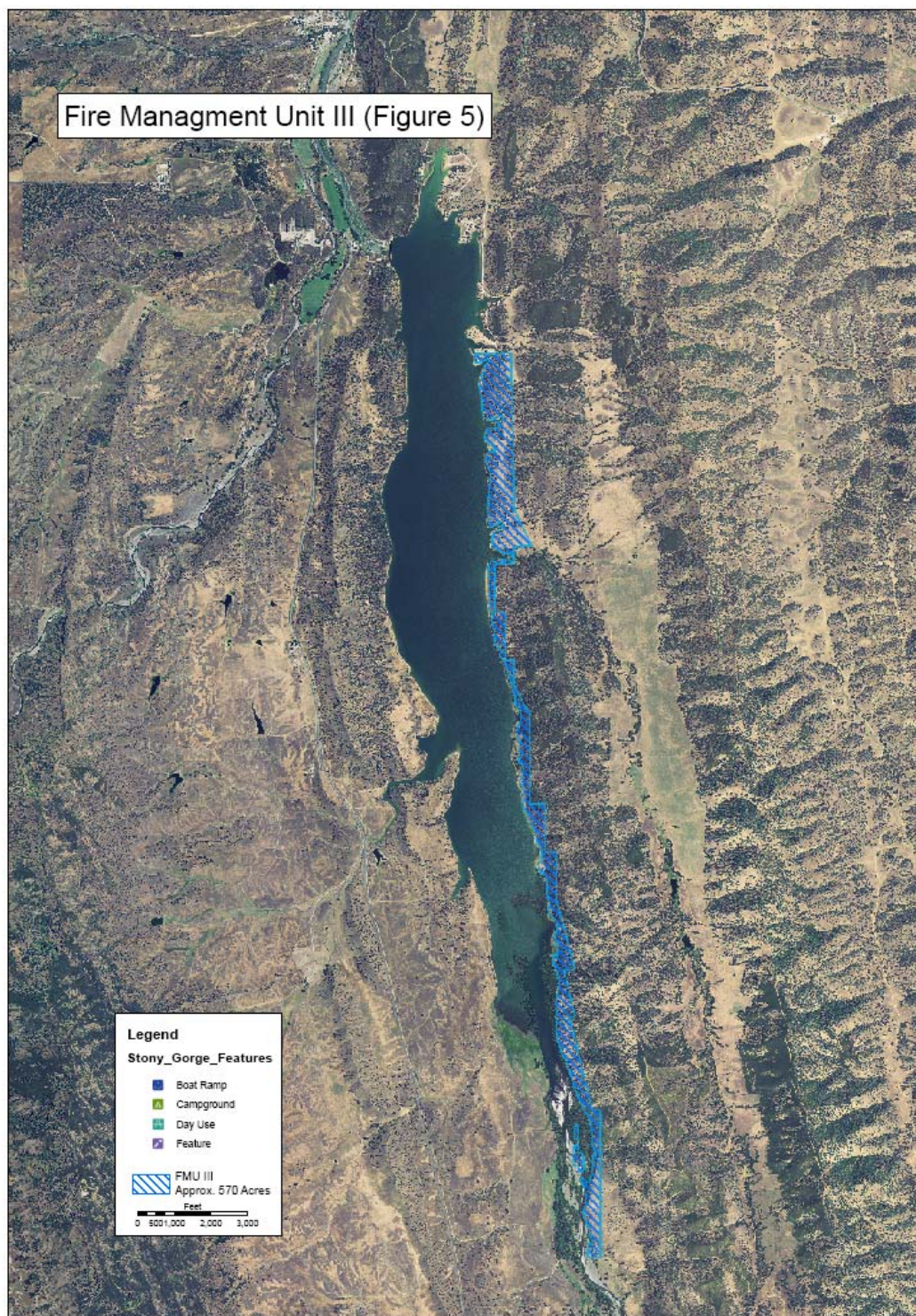
Reclamation's fire suppression strategy for FMU II (Figure 4, see page 16) is to contain wildfires to 100 acres or less within 24 hours. This area sees little human presence and mostly contains oak woodland/grassland habitat and invasive species such as yellow starthistle and medusahead. A bald eagle nest has been observed in this unit just outside the Reclamation boundary on private land. The unit contains breeding habitat for blacktail deer (*Odocoileus hemionus columbianus*), as well as sensitive flowers. There are few structures in this unit, with a ranch southwest of the unit.




	STONY GORGE RESERVOIR		Sheet:
	FIRE MANAGEMENT PLAN		3 of 4
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22-214-000049_003_00.pdf	BOUNDARY AND FEATURES (FIGURE 4)		
Date of Creation:	Created/Revised By:	Revision Number/Date:	Drawing/Map Number:
30-Jul-07	cchambers, NC-245		22-214-49

Reclamation's fire suppression strategy for FMU III (Figure 5) is to contain wildfires to 100 acres or less within 24 hours. This area sees little human presence and mostly contains oak woodland/grassland habitat and invasive species such as yellow starthistle and medusahead . The unit contains breeding habitat for blacktail deer (*Odocoileus hemionus columbianus*), as well as sensitive flowers. There are few structures in this unit, with ranches east and southeast of the unit.

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	STONY GORGE RESERVOIR		Sheet:
	FIRE MANAGEMENT PLAN		4 of 4
Filename:	FIRE MANAGEMENT UNIT III		Page:
22-214-000050_004_00.pdf	BOUNDARY AND FEATURES (FIGURE 5)		
Date of Creation:	Created/Revised By:	Revision Number/Date:	Drawing/Map Number:
30-Jul-07	cchambers, NC-245		22-214-50

d. Wildland Fire Situation Analysis

A Wildland Fire Situation Analysis (WFSA) (Appendix 4) will be prepared whenever a wildfire escapes initial action, is expected to exceed initial action, or when a prescribed fire exceeds its prescription parameters and is declared a wildfire.

The purpose for completing a WFSA is to convey to an Incident Management Team (IMT) the critical objectives and priorities as defined by an Agency Administrator for a given incident. An IMT needs sufficient information to get an implementable incident action plan formulated and order the needed resources to support it. This requires clear and measurable objectives that consider all the current and potential issues of wildland fire suppression.

It also can serve as a tool to share with the public and cooperators the approved strategy related to the fire. It is intended to be a dynamic process: it likely will require updates and modifications throughout the management of an incident. As the complexity of a wildland fire escalates, so should the WFSA documentation and the underlying analysis that supports the decision.

e. Fire Prevention, Community Education, Community Risk Assessment, and Other Community Assistance Activities (Firewise)

- **Prevention Program** – Reclamation provides ranger patrols for fire prevention and visitor contact to provide fire restriction information concerning campfires and prohibited use of fireworks. A lease for cattle grazing has been issued yearly to use cattle as a tool to reduce fuel load. Mechanical and chemical control of invasive weeds is desirable.
- **Special Orders and Closures** – Under high fire danger (red flag warning) restrictions may be put into effect by Reclamation that could close the park to the public or would prohibit the use of campfires, charcoal barbecues, or other sources of fire. Signs would be posted at entrances to the visitor use areas that would provide the fire danger intensity (high, moderate, low) based on current weather information provided on such sites as the Climate, Ecosystem and Fire Applications (CEFA) site/Experimental Climate Prediction Center (ECPC): (<http://www.cefa.dri.edu>) which provides products and information related to climate, weather, fire, and natural resources. Extreme fire danger would be determined by weather conditions and fuel condition as described by the National Weather Service and CAL FIRE. Should a fire occur that requires erosion control practices and reseeded, areas may be closed to rejuvenate native plant growth during the revegetation process.

f. Training and Qualifications

Reclamation's NCAO Area Manager (Area Manager) is responsible for ensuring that all divisions involved in fire management activities and prescribed burns (including burning of debris piles) will follow individually approved burn plans. Only properly trained and qualified personnel will conduct fire management activities on Reclamation lands. Only fire-suppression qualified and red-carded individuals will participate directly in wildfire suppression activities. Resource Advisors will be trained and certified in the Incident Qualifications and Certification System (IQCS).

g. Detection

Reclamation has no official fire detection program and relies on direct observances or reports of fires from employees and/or the public to contact emergency services (911). Rangers patrol the area on occasion to identify fuel load concerns.

There are no fire lookouts in the Stony Gorge area, and on occasion, CAL FIRE may use aerial surveillance should lightning strikes occur. CAL FIRE predominantly relies on fires reported to 911 to begin the response procedure.

h. Fire Weather and Fire Danger

Current weather information is found on such sites as the Remote Automated Weather Station (RAWS)/Real-time Observation Monitor and Analysis Network (ROMAN) at <http://raws.wrh.noaa.gov/roman>. The National Weather Service (<http://fire.boi.noaa.gov/>) has hourly fire danger maps (<http://www.cefa.dri.edu/HourlyFD/>) that describe the locations of low to extreme fire danger areas. Reclamation relies on CAL FIRE and other agencies to calculate and report fire danger. The CAL FIRE dispatch center in St. Helena, California calculates fire danger twice a day, in-house, based on current temperature, wind, humidity, fuel load, etc.

i. Aviation Management

Reclamation does not maintain aviation resources in the Mid-Pacific Region. CAL FIRE has no aviation management program in Glenn County; however, they may use other air resources to patrol the area on occasion. CAL FIRE has air tankers located in Redding and Chico and helicopters in Vina, California.

Reclamation abides by the regulations and standards established by the Department's Aviation Management Directorate (AMD). This office provides oversight and certification of aviation resources including aircraft, pilots, and maintenance schedules. AMD provides aircraft source lists, which contain the

Federal Aviation Administration registration numbers of aircraft and the names of certified (carded) vendors and pilots for use by all Department agencies. CAL FIRE's aviation resources and standards are recognized as adequate by the AMD.

Reclamation currently does not contract for any fire-related aviation services in the Mid-Pacific Region.

j. Initial Attack

Initial attack (first response) will generally originate out of the Tehama-Glenn Unit (Battalion 4). Because Stony Gorge is located within a CAL FIRE DPA, CAL FIRE should suppress fires with no cost to Reclamation within the first 24 hours, unless other arrangements are made. CAL FIRE has the right to cross any property and use any means necessary (such as using water in private ponds or Reclamation reservoirs) to combat an emergency fire situation. CAL FIRE is required to compensate any private landowners for damage of roads, use of water from private ponds, etc. Initial attack will be aggressive when needed to protect life or property in imminent danger; however, minimum impact suppression tactics are desired to protect the environment in certain locations. These are outlined in the Operating Plan prepared by Reclamation and provided to CAL FIRE.

k. Extended Attack and Large Fire Suppression

Extended fire suppression operations by CAL FIRE which exceed 24 hours will be guided by Reclamation's current agreement with CAL FIRE outlining the procedures and billing arrangements in cases of "assistance for hire."

All large fires will be organized according to the incident command system (ICS) structure, an emergency response and operations management system which describes the coordination and communication with the community emergency operations center and and/or central dispatch center. The ICS philosophy and concepts of effective emergency operations include community emergency management; response management by the incident commander (IC); awareness of the organization response plan; procedures for first notice, situation analysis, and determining urgency; on-scene management, role of the emergency operations center; legal issues; dealing with the media; and relevant Federal legislation, rules, and standards.

l. Fire Reporting

All fires will be reported on form DI-1202 (Individual Fire Report, Appendix 6) and input to the Fire Reporting Module of the Wildland Fire Management Information System (WFMI-FR). The WFMI-FR is a Bureau of Land Management (BLM) administered system, which includes fire occurrence data archiving and storage. The system is used by the Bureau of Indian Affairs and

the National Park Service (NPS) as well as BLM for archiving fire occurrence data. Currently, Reclamation has no official internal system for archiving such data. It is important to record fire occurrence data on Reclamation lands in order to better plan, budget for, and respond to future challenges and needs in the fire management environment.

m. Other Fire Suppression Considerations

Stony Gorge is a relatively small unit with little complexity and has experienced a low fire occurrence over the past 45 years. No Reclamation employees will perform fire suppression activities unless they are properly trained for the position held and hold certification in the IQCS to that effect. The cooperative agreement Reclamation holds with CAL FIRE is currently the only means used to achieve wildfire suppression goals. Prescribed fire goals can be achieved through CAL FIRE or by contract with approved fire management organizations. Other means for hazardous fuels reduction or habitat improvement such as mechanical, chemical, or biological control methods may be employed by Reclamation independently of CAL FIRE.

2. Prescribed Fire

Prescribed fires are desired to (1) enhance habitat by removing excess decadent or over-abundant vegetation; (2) reduce hazardous fuel loading for pre-suppression mitigation; (3) control invasive weeds such as yellow starthistle, medusahead, etc., to encourage native perennial grass growth; and (4) dispose of stockpiled debris resulting from mechanical fuels reduction or other vegetation control programs. Prescribed burns will be conducted in accordance with the Multi-Agency Agreement for the Cooperative Use of Prescribed Fire (contract number 8CA02011) and the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide (RX Fire Guide) (Appendix 5).

a. Planning and Documentation

For projects involving the use of CAL FIRE crews or other resources, Reclamation will prepare and provide two documents for any prescribed burn; the Prescribed Burning Project Standard Agreement (RM-70) and an approved prescribed burn plan. Individual approved burn plans will follow the Federal template and will be prepared for each prescribed burn. Examples of prescribed burns at Stony Gorge may include: (1) burning stands of invasive weeds such as yellow starthistle, medusahead grass, etc., (infestation estimated at several hundred acres) for their removal and preparation for revegetation activities as needed for adequate control; and (2) burning of wood and other burnable debris piles as needed.

In addition to working with CAL FIRE, prescribed fire (Rx) assistance may be requested and obtained by ordering Rx fire resources from other Federal or

private agencies on a case-by-case basis or through future interagency or other agreements/contracts. Fire Use Module units may be available to conduct prescribed fires. The Fire Use Module (Program) has developed teams of experienced and specialized fire personnel whose mission is to develop and provide national self-sufficient, multi-skilled fire professionals with a primary commitment to fire use operations and planning.

Planning of Prescribed Burns. The Area Manager will assign a Resource Manager/Advisor to plan each prescribed burn to ensure that prescribed burns are in compliance with any approved resource management plan and fire management plan. Burn plans will be prepared by the Resource Advisor (if qualified) or by contract. In-depth familiarity with the fire unit and the Rx Fire Guide are required to successfully prepare the burn plan.

Burn plans will be technically reviewed by a qualified individual rated no lower than RXB2 (see preparation and review requirements, page 11, in the Rx Fire Guide). This can be done through interagency agreement or contract with an agency or contractor employing RXB1- or RXB2-qualified personnel. The burn plan must be approved by the Reclamation Area Manager at least 30 days prior to implementation of the burn.

The burn plan is a field document that describes the details for conducting a particular burn treatment at a particular burn unit. The burn plan is much more specific than the Fire Management Plan. It is also a legal document that details prescription parameters, safety considerations, and professional standards to be used in conducting the burn. It will clearly document the planned sequence of the project and the responsibility of any participating agency for activities to meet the project objectives. All prescribed fires that escape control parameters will be treated as a wildland fire.

All burn plans must be signed and dated by the preparer, technical reviewer, burn boss, and, if CAL FIRE is conducting the burn, by CAL FIRE's Registered Professional Forester (RPF) before the burn is executed. The signature of the RPF signifies his/her approval of the content and technical details of the written plan. The burn boss/IC is responsible for abiding by the terms of the burn plan in conducting the burn.

Final approval for the burn plan is given by Reclamation's Area Manager. Those approving the plan are responsible for its content. The format for a burn plan shall follow the interagency burn plan template outlined in Appendix B of the Rx Fire Guide and should contain the following burn plan elements:

- Signature Page. Signatures are required by the Federal technical reviewer (MP-450), the Area Manager (NC-100), and the IC/burn boss.
- Geographic/Project location.

- Sources of emergency assistance.
- Description of the prescribed burn area (vegetation type and fuel models by percent of unit, narrative description of unit).
- Goals and objectives.
- Fuel and weather prescription.
- Type of prescribe burn and desired fire behavior to meet objectives (narrative description).
- Smoke management.
- Crew (number and organization).
- Equipment.
- Day of burn operations/site preparation plan (firebreak preparation, ignition plan, holding plan, communications, mop-up standards, public relations).
- Contingency plan (predicted fire behavior for free-running fire, both inside and outside the unit; location, type, and response time of emergency resources; secondary control lines).
- Backup source of water delivery.
- Safety and medical information.
- Public information plan.
- Appropriate ICS documentation (confirmation of required planning, exemptions, and justifications).
- Technical review.
- Job Hazard Analysis.
- Post-burn activities.
- Maps.
- Go/No Go Checklist on day of burn—with separate Area Manager/burn boss signature.

Contacts to be made. Reclamation's Resource Advisor will contact CAL FIRE and provide CAL FIRE with a copy of the approved burn plan during the planning phase. The operating plan will also be provided and reviewed. An individual cooperative agreement/letter of understanding or other document required by CAL FIRE specifying the location, desired dates, maps, and other details of the specific burn may be prepared by the Resource Advisor, if necessary. This document will include the details of any payment or equipment reimbursement, etc. The Resource Advisor will also prepare any required environmental documentation (Categorical Exclusion Checklist), press releases, flyers posted at local businesses, and other public notification including contact with the Regional archeologist, local sheriff's office, State Department of Fish and Game, the Orland Unit Water Users' Association, the Mendocino National Forest, and the Stonyford Resource Conservation District. The Glenn County Air Pollution Control District will be notified verbally, and any requirements they have will be met in advance of the burn.

Permits/Forms. No encroachment permits are required for CAL FIRE to enter upon Reclamation land for the purpose of conducting a prescribed burn at Reclamation's request. Prescribed burns will be documented and reported to the Regional Office (MP-450) who will enter the information into the WFMI on the DI-1202 Individual Fire Report template (Appendix 6). The Resource Advisor will ensure pre-burn, burn, and post-burn monitoring and will prepare a follow-up report stating whether the burn met the burn plan objectives. No permits are required from the county, but county regulations regarding burn, no-burn days must be followed.

Qualified Personnel. Only CAL FIRE and/or other Federal personnel that are trained and qualified will conduct prescribed burns. No Reclamation employees will be involved directly in the prescribed burn activities unless they are properly trained and certified.

b. Air Quality and Smoke Management

According to the Colusa County Air Pollution Control District, there are no pertinent air quality issues in Colusa County unless a major fire occurs. Smoke-sensitive areas are the communities of Lodoga and Stonyford and adjacent ranches that have year-round residents. There are no Class I airsheds or corridors in the Stony Gorge area. Colusa County is classified as a non-attainment area regarding California air quality restrictions and an attainment area for Federal air quality restrictions. A non-attainment area is any area that does not meet the Federal or state air quality standard because of exceedances of any of the National Ambient Air Quality Standards for the six-criteria pollutants. An attainment area meets the national primary or secondary ambient air quality standard for the pollutant.

Local and regional smoke management restrictions are defined in Title 17 of the California Code of Regulations and the Sacramento Valley Agricultural Burn Plan.

3. Non-Fire Fuel Treatments

Biological control. The west side of the reservoir has been grazed annually by cattle through a lease issued by Reclamation in Tract II (FMU II) since the 1970s. The acreage for cattle grazing is reported as 740 acres according to the lease, but this may also include water acres. Cattle grazing by lease could increase to include the approximate 570 acres in FMU II and the approximate 150 acres (which excludes the dam operations area) in FMU I, if additional tracts of land located on the east side of the reservoir are properly fenced for grazing, and a new lease is issued. Goat grazing should also be considered as an economical method of reducing fuel load. The primary purpose of the cattle grazing lease is to use cattle as a tool to reduce the fuel load and weed biomass. A range technician began initial monitoring of the lease effects in 2005/2006. A report was prepared in 2006 with recommendations to revise the lease terms to increase the efficiency of the cattle use to meet specific resource goals. These goals include reducing yellow starthistle and other invasive weeds at appropriate times of the year and reducing the fuel load in upland areas where cattle do not prefer to graze.

Mechanical/chemical control. CAL FIRE hand crews may be available for such mechanical or manual labor activities such as construction of safety lines, wind breaks, and prescribed burn area preparation. This may include construction of containment lines around project perimeters and cutting and piling of invasive weed species in preparation for future burning of piles, etc. Federal fire use modules, if available, are another potential source of conducting prescribed burns.

Approximately 10 acres of land around the recreation areas are treated by chemical means by Reclamation certified applicators for weed control each spring.

D. Description of Wildland Fire Management Strategies by Fire Management Unit

The 1,191 acres of land around Stony Gorge have been divided into three FMUs, identified on the basis of geographic location: (1) FMU I covers the approximate 258 acres of recreation areas and the land surrounding the dam on the north end of the reservoir, (2) FMU II describes 363 acres on the west side, and (3) FMU III describes the approximate 570 acres to the east (see Figure 2). All units are on Reclamation land. This 10-year plan is proposing the use of a combination of fire suppression, prescribed burning, biological and mechanical reduction of fuels, and fire effects monitoring where needed. Air quality issues will be addressed for all fires.

Reclamation's Regional office personnel prepared the programmatic agreements with CAL FIRE. Area offices will administer repayment for fire suppression and prescribed

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burning, oversight of fire prevention, suppression, and prescribed burning operational plans.

Reclamation will direct that MIST be used in all fire management activities where applicable. An operating plan discussing MIST objectives will be provided to the CAL FIRE office annually. Reclamation will also dispatch a trained Resource Advisor or other agency representative to any fire larger than 10 acres to consult and negotiate on-site with the initial attack IC to discuss MIST practices. MIST is defined as the application of techniques that effectively accomplish wildland fire management objectives while minimizing the impacts to cultural and natural resources commensurate with ensuring public and firefighter safety and effective wildland fire control. Examples of MIST include using existing natural or constructed barriers to contain wildland fires, mowing firebreaks in grassland, and using pumps and hoses to apply water to suppress fire activity and reduce fire spread. See Appendix 7 for MIST Guidelines.

Fire Regimes/Condition Classes:

There are five natural fire regime classifications (Table 1) which are described based on the average number of years between fires, combined with the severity of the fire on the dominant vegetation.

Table 1. Natural Fire Regime Classifications

Natural Fire Regime	Frequency of fires and severity to vegetation.
I	0-35-year frequency and low-to-mixed severity (less than 75% of the dominant overstory vegetation replaced).
II	0-35-year frequency with high severity (greater than 75% of the dominant overstory vegetation replaced).
III	35-100+ year frequency and mixed severity.
IV	35-100+ year frequency with high severity.
V	200+ year frequency and high severity.

A fire regime condition classes describe how the role of fire may depart from a natural regime (absence of modern human intervention). There are three condition classes (Table 2): low, moderate, and high.

Table 2. Description of Condition Classes

Condition Class	Departure of fire from natural state.
1	Low departure of the role of fire from natural state and within the natural range of variability with regard to the vegetation characteristics (species composition, structural stages, stands age, canopy closure, mosaic pattern). Risk of losing key ecosystem components is low.
2	Moderate departure from natural regime. Moderate changes may result to one or more of the following: fire size, intensity and severity, and landscape pattern.
3	High departure from natural regime where fire regimes have been substantially altered. Dramatic changes can occur to key ecosystem components.

The following link contains the guidebook for the interagency fire regime condition classes:

http://www.frcc.gov/docs/1.2.2.2/Complete_Guidebook_V1.2.pdf

1. **FMU Descriptions**

FMU I

Characteristics:

The FMU I (Figure 3) is on the north side of Stony Gorge Reservoir and extends from south of Stony Gorge Dam on the northwest side of the reservoir to the locked gate adjacent to the Figs II Campground on the northeast side. Access is via State Route 162 (from Willows to Elk Creek), north of the reservoir to a semi-paved Glenn County road which extends south to the reservoir. This area is open year-round to the public on weekends and full-time during dry weather.

The FMU contains seven primitive camp areas (Pines Group Camp (northwest), and on the northeast side, Grimy Gulch, Elk Creek Hill, Stony Point, Hidden Point, Fig Orchard I and Fig Orchard II. Skippers Point contains a day-use area with vault toilets and a boat ramp, and Stony Gorge Dam and spillway. An overview of habitat types includes a small marsh on the north end, seasonal and perennial introduced grassland with such species as medusahead and wild oat, disturbed woodland with blue oak, willow, and grey pine adjacent to the water, chaparral in the upland areas north of the dam and spillway, and the foothill woodland community above the chaparral with blue oak, interior live oak, and grey pine. Riparian bottomland exists in the northern section of the FMU, below Stony Gorge Dam. Dispersed local residences and ranches occur around the unit, and private rangeland is adjacent/east of the Mendocino National Forest to the west of this FMU.

Elevations of the water surface range from 811 to 827 feet. From the north, the FMU contains a small marsh area. Going southwest is the group camp and day-use area and the dam. Going southeast are the remaining campgrounds, day-use areas, and the boat ramp area. The camp and day-use areas have sparse vegetation, except for weeds, due to overuse by the public. The terrain is hilly with some level ground in the vicinity of the shoreline; the areas next to the reservoir are mostly bare soil, with weeds such as yellow starthistle (*Centaurea solstitialis*) and cocklebur (*Xanthium strumarium*), and annual grasses such as medusa head (*Taeniatherum caput-medusae*) and brome (*Bromus spp.*). Chamise chaparral/northern mixed chaparral/juniper scrub/oak-woodland communities occur in the upland areas. The chamise chaparral is composed of stands of chamise (*Adenostoma fasciculatum*), scrub oak (*Quercus ilicifolia*), buckbrush (*Ceanothus cuneatus*) and manzanita (*Arctostaphylos spp.*), with an open to sparsely-vegetated understory, mainly of native annual and perennial forbs in low abundance and diversity. Sensitive plants such as the adobe lily (*Fritillaria pluriflora*) and Brandegees' eriastrum (*E. brandegeae*) are located near or in this FMU. The adobe lily has been recorded in

the northeast tip of the reservoir and on the east side of the reservoir on BLM land. Brandegee's eriastrum has been recorded west of the reservoir on BLM land.

Fire Regime/Condition Class:

Since 1921, the only fire reported near the reservoir occurred in 1988; another fire nearby was reported in 1977. It is thought other fires may have occurred which have gone unreported. With a documented fire frequency of two fires in approximately 90 years, it has been determined by Reclamation, according to the interagency fire regime condition class guide, that the chamise/chaparral habitat of this unit falls into fire regime three and condition class two.

Values at Risk:

Wildlife/Plants. Should unwanted fires occur, or should fires occur at a time when wildlife are breeding/nesting, then long-term damage can occur to the bird species that breed in the area. Sensitive plants may be harmed if fires occur during the growing season.

Visitors. In the recreation season, which can be year-round in this FMU, but is typically April/May through September, any fire would be considered a danger to the public and would be immediately suppressed.

Cattle. There is no lease issued for grazing in this FMU; however, trespass grazing has occurred.

Landowners. Some residences occur west of the dam, and Reclamation's office is adjacent to the reservoir on the east side. Ranch land occurs to the west, north, and northeast of this FMU.

Communities at Risk. There are no communities within the FMU; however, several communities occur nearby in the wildland/urban interface. The community of Elk Creek is located northwest of the FMU.

FMU II

Characteristics:

FMU II is on the west side of Stony Gorge Reservoir and extends from south of Stony Gorge Dam, south to the inlet of Stony Creek. The only road access is through private land. In rainy weather access would be difficult for any equipment other than a 4x4 truck. Access is also available by boat. This area is closed year-round to the public, except for boat access.

The FMU contains no facilities. It consists mostly of non-native annual grassland adjacent to oak woodland with native annual forbs. Blue oak woodland is common

on rolling uplands and north- and east-facing slopes, especially on the upper slopes of the main ridge with scattered small stands of gray pine. This FMU is bordered by riparian marshes at its southernmost tip.

This area is used by blacktail deer (*Odocoileus hemionus columbianus*), nesting bald eagles (*Haliaeetus leucocephalus*), and other animals. There is one confirmed bald eagle nest in this FMU, which showed activity in the 2006 season, but not in the 2007 season.

Fire Regime/Condition Class:

With an estimated fire frequency of less than one in 100 years, it has been determined the predominant oak woodland habitat of this unit falls into fire regime three and condition class two.

Values at Risk:

Wildlife. Should unwanted fires occur, or should fires occur at a time when wildlife are breeding/nesting, then long-term damage can occur to the bald eagle and other bird species that breed in the area. The bald eagle habitat must not be disturbed between mid-February through July. Breeding success depends on lack of disturbance.

This FMU also contains habitat for deer, wild pig, and other mammal breeding. To protect the breeding season for mammals, prescribed fires should never occur from mid-March through at least June.

Visitors. Since this FMU is not used or accessible to the public other than to an occasional boater, the only danger an unwanted fire may present would be to the adjacent Groteguth Ranch to the southwest and the Orland Project dam tender residence southwest of the dam.

Cattle. Cattle are allowed to graze the entire portion of the FMU year-round. Any fires would need to be suppressed during the time cattle are present immediately adjacent to the reservoir.

Landowners. Groteguth Ranch to the southwest is the only observed ranch in the area.

Communities at Risk. The closest community is Elk Creek several miles northwest of the FMU.

FMU III

Characteristics:

FMU III is on the east side of Stony Gorge Reservoir and extends from the locked gate southeast of the campgrounds, south to the inlet of Stony Creek. Access is only from the two-lane County Road 204 on the east side of the reservoir that extends from Highway 162 to the locked gate adjacent to Figs II Campground. South of the locked gate, the road continues in poor condition. This area is open seasonally, usually April to October, and is accessible by the public by boat or by foot. Access may be available east from Fruto.

The terrain is hilly, with some level ground in the vicinity of the shoreline; the areas next to the reservoir are mostly covered with weeds such as yellow starthistle and cocklebur and annual grasses such as medusa head and brome. Blue oak woodland and juniper scrub are common on rolling uplands and north- and west-facing slopes, with scattered small stands of gray pine (*Pinus sabiniana*).

Scattered small stands of northern mixed chaparral occur, as well as juniper scrub.

Fire regime/condition class:

With an estimated fire frequency of less than one in 100 years, it has been determined the chamise/chaparral habitat of this unit falls into fire regime three and condition class two.

Values at Risk:

Wildlife. Should unwanted fires occur, or should fires occur at a time when wildlife are breeding/nesting, then long-term damage can occur to the species that breed in the area.

This FMU contains habitat for deer, wild pig, and other mammal breeding. To protect the breeding season for mammals, fires should never occur from mid-March through at least June.

Visitors. This area is seldom used by the public except for an occasional boater. In the recreation season, which is typically May through September, any fires would be considered a danger to the public and would be required to be immediately suppressed.

Cattle. No lease for cattle grazing has been issued in the FMU, although trespass grazing has occurred.

Landowners. Ranchland occurs to the east, south, and north of this area.

Communities at Risk. There are no communities in the immediate area.

IV. Burned Area Emergency Stabilization and Rehabilitation

In the case of extreme fire occurrence where little to no vegetation remains, emergency stabilization activities will be implemented. Use of water bars or other appropriate erosion control methods, reseeding with native plants, and necessary area closures will occur as budget permits. Erosion control methods that are conducted will be according to the Emergency Stabilization and Rehabilitation (ESR) Guidebook and Departmental policy outlined in the Department Manual 620 DM 3, as follows:

A. Emergency Stabilization

1. Emergency stabilization actions will be based on an ESR Plan developed immediately post-fire or in a supplement plan, except where programmatic plans are already in place. The programmatic plans are generally written by a field office unit and include an environmental assessment and are developed at the landscape level, with public input. The decision to develop the programmatic plan is based on the size and diversity of the ecosystems involved, fire history, resource values, and resource management objectives and decisions in land-use plans. For multi-agency fires, joint planning is encouraged. The development and implementation of an ESR Plan and its associated treatments are the responsibility of the local agency administrator.
2. The costs and magnitude of emergency stabilization actions should be commensurate with threats to life, property, or resources as documented by a cost-risk analysis.
3. Emergency stabilization projects are unpredictable, requiring funding on short notice. Allowable actions are those required to:
 - a. Prevent or mitigate threats to human health and safety or property, including roads and trails.
 - b. Stabilize soil to prevent or mitigate loss or degradation of productivity.
 - c. Stabilize watersheds to prevent unacceptable downstream damage on and off site, including significant erosion or mass wasting.
 - d. Minimize unacceptable deterioration of water quality.
 - e. Protect emergency stabilization treatments, utilizing fencing, patrolling, or other measures.

- f. Stabilize and prevent unacceptable degradation of historic properties listed on or potentially eligible for the National Register of Historic Places or federally- and state-listed threatened or endangered species or their habitat.
 - g. Establish or reestablish native species to prevent or minimize the establishment of non-native invasive species, and facilitate long-term ecosystem restoration goals stated in land management plans. Such actions will be specified in the emergency stabilization section of the ESR Plans only when immediate action is required or when there are clear precedents and such actions are a routine element of all ESR Plans within similar vegetation types. Otherwise, ESR Plans may contain a rehabilitation section that outlines the general need for such actions, but defers specific actions until post-fire rehabilitation needs assessments are completed. Treatment specifications developed from these assessments may be funded as a supplement to the ESR Plan for up to two growing seasons after fire control.
4. Emergency stabilization activities must be compatible and generally consistent with approved land use plans and can include:
- a. Replacing or repairing facilities essential to public health and safety, and replacing or constructing fences or other structures necessary to protect emergency stabilization projects or to prevent further degradation of natural and cultural resources during the project period.
 - b. Physical structures and devices to slow the movement of soil and water downslope, such as check dams, culverts, silt fences, log erosion barriers and straw wattles, erosion cloth, and soil netting. These treatments are primarily temporary measures that do not generally require maintenance or are removed after objectives have been met.
 - c. Conducting habitat damage assessments for threatened, endangered, and other special status species to identify mitigation requirements. Damage assessments and treatments are limited to species that are known to be detrimentally impacted by wildland fire or those for which there is reasonable expectation of detrimental impacts. Also, there must be reasonable expectation that the detrimental impacts can be mitigated. The scope and cost of mitigation should be the minimum necessary to alleviate significant threats.
 - d. Seeding or planting of shrubs, forbs, and grasses to prevent critical habitat for federally-listed threatened or endangered species, or other special status species from being permanently impaired or to prevent erosion or mass wasting.
 - e. Seeding or planting of shrubs, forbs, and grasses to facilitate the natural succession of vegetative communities that were largely composed of native species before the fire, but which would likely be subject to immediate and aggressive invasion of non-native invasive species after the fire.

- f. Seeding or planting trees, only if such actions have been demonstrated to be cost-effective in meeting project objectives of stabilizing watersheds to prevent downstream damage on and off-site.
 - g. Use chemical, biological, or mechanical treatments necessary to minimize the establishment or reestablishment of non-native invasive species within the burned area.
 - h. Monitoring and patrolling necessary for public safety and natural and cultural resource protection, if such activities cannot be accomplished within existing capabilities and by shifting priorities.
 - i. Covering, camouflaging, cleaning, burying, or reinforcing historic properties to prevent erosion, weathering, movement, and looting.
 - j. Assessments may be conducted to assess damage to documented historic properties or those discovered in the course of treating known properties.
5. ESR planning team activities are an integral part of wildland fire incidents. They are governed and supported by the same wildland fire incident mobilization, resource availability, training, qualifications, and incident business management procedures as other aspects of the incident.

B. Rehabilitation

1. Post-fire rehabilitation projects implement the types of long-term actions that have already been identified in approved land management plans. The purpose of rehabilitation is either to emulate historical or pre-fire ecosystem structure, function, diversity, and dynamics consistent with approved land management plans, or if that is infeasible, then to restore or establish a healthy, stable ecosystem in which native species are well represented. Rehabilitation actions must be related to damage or changes caused by a wildland fire and cannot include constructing facilities or implementing desired conditions that are unrelated to the wildland fire event. Rehabilitation cannot be funded for prescribed fire projects in which fire behavior was within prescription. Rehabilitation actions may be planned and funded only for projects that were declared wildland fires because fire behavior exceeded prescription parameters. Rehabilitation may include actions to:
 - a. Repair or improve lands unlikely to recover naturally from wildland fire damage by emulating historical or pre-fire ecosystem structure, function, diversity, and dynamics consistent with existing land management plans.
 - b. Restore or establish a healthy, stable ecosystem even if this ecosystem cannot fully emulate historical or pre-fire conditions.
 - c. Tree planting is limited to:

- (i) Facilitating the succession and stabilization of forest ecosystems.
 - (ii) Reestablishing habitat for federally-listed threatened or endangered species or other special status species.
 - (iii) Reintroducing or reestablishing native tree species and seed sources lost in stand replacement fire.
 - (iv) Regenerating Indian trust commercial timberland identified in an approved Forest Management Plan and that a certified silviculturalist has determined will not naturally regenerate for more than 10 years after the fire.
- d. Repair or replace fire damage to minor operating facilities, e.g., campgrounds, interpretive signs and exhibits, shade shelters, grazing fences, wildlife guzzlers, etc. Rehabilitation may not include the planning or replacement of major infrastructure, such as visitor centers, residential structures, administration offices, work centers, and similar facilities. Rehabilitation does not include the construction of new facilities that did not exist before the fire, except for temporary and minor facilities necessary to implement burned area emergency stabilization and rehabilitation efforts.
2. The rehabilitation section of the ESR Plan must contain:
- a. A discussion demonstrating how the specifications are consistent and compatible with approved land use plans and how the proposed actions are related to damage or changes caused by the wildland fire.
 - b. Provisions for monitoring and evaluation of treatments and techniques and a procedure for collecting, archiving, and disseminating results.
 - c. Clear delineation of funding and responsibilities for implementation, operation, maintenance, monitoring, and evaluation throughout the entire life of the project, including ESR actions and follow-up actions beyond 3 years that may be necessary to ensure the effectiveness of initial investments.

Burned Area Emergency Stabilization and Rehabilitation Assistance.

The current Federal fire policy states that "... there will be no billing or reimbursement between bureaus of the Department and the Department of Agriculture for personnel and other resources involved in burned area emergency stabilization and rehabilitation team deployment" However, Reclamation receives its appropriations differently than the other Department fire agencies and the Forest Service. Reclamation cannot access the project-specific cost codes established for incident responses, including BAER (burned area emergency response); therefore, Reclamation will receive reimbursement for Reclamation employees assisting other agencies on BAER assignments and pay assisting agencies for personnel time and supplies expended on Reclamation BAER projects.

V. Community Protection/Community Assistance

Currently, Reclamation is not involved in the planning or funding of any community assistance projects or programs and relies on CAL FIRE to assess the risks to Wildland Urban Interface communities in the area as well as providing them information on current fire management or prevention plans and hazard assessments.

A copy of this FMP will be available to the public by request.

VI. Fire Management Components

A. Fire Suppression

1. FMU I

All wildland fires, regardless of ignition source, will receive prompt suppression action commensurate with human safety and need. Minimum impact suppression tactics will be used except when human life or property is in imminent danger.

Constrictions to suppression actions include non-use of heavy equipment in riparian areas (below the dam) and non-use of retardants in lake, riparian zones, or areas of sensitive habitat identified in the annual Operating Plan as no-drop zones, unless approved by the Resource Advisor on a case-by-case basis or unless human life or residential structures are in danger.

The landscape supports a complex pattern of open areas, marshes, grasslands, chamise chaparral, and oak woodlands. There is not a large accumulation of understory debris; however, this may increase in the future. The presence of highly combustible plants such as chamise, sagebrush, and thistles may result in a highly intensive and fast-spreading wildfire, should one occur.

Constraints for FMU I

Vehicular access to the terrain south of the Pines Group Camp and Stony Gorge Dam may be difficult as the main access road does not connect to this area.

Procedures for FMU I:

- All fire-management-related activities will be based on safety of personnel and the public as the highest priority.

- Dozers and other heavy equipment will be used when life, property, and/or historic properties are at risk.
- Low-level aircraft use, including application of retardant, will be employed for protection of life, property, or vulnerable cultural resources, or at the discretion of the IC after consultation with the Area Manager or Reclamation's Resource Advisor.
- All fire suppression personnel operating within the FMU will be briefed regarding known hazards, LCES (Lookouts, Communications, Escape routes, Safety zones), current and predicted weather, and current fire behavior by the IC.
- MIST will be employed to ensure protection of cultural sites and features. A map of "special areas of concern," if appropriate, will be made readily available in the respective agency resource offices for use of suppression resources.
- Mechanical hazard reduction will be applied to create defensible space and reduce potential intensities.

2. FMU II

All wildland fires, regardless of ignition source, will receive prompt suppression action commensurate with human safety and need. Minimum impact suppression tactics will be used except when human life or property is in imminent danger and then an aggressive approach will be taken.

Constrictions to suppression actions include the non-use of using heavy equipment in riparian areas (southernmost region) unless approved by the Resource Advisor on a case-by-case basis.

Retardants should not be used February through June to protect the sensitive wildlife areas such as the bald eagle nest area (on private land) on the west side of the unit. Care will be taken to protect the bald eagle nesting tree located on the western portion of the FMU near the reservoir. The entire unit may be a breeding and birthing area for mammals.

The landscape supports a complex pattern of open areas, grasslands, some chamise chaparral, and predominantly oak woodlands. There is a low to moderate amount of understory debris; however, this may increase in the future.

Constraints for FMU II

Vehicular access to the terrain is only by boat or through private property. Use of helitak and bucket drops is advisable in this area.

Procedures for FMU II:

- All fire-management-related activities will be based on safety of personnel and the public as the highest priority.
- Dozers and other heavy equipment are allowed when life, property, and/or historic properties are at risk.
- Low-level aircraft use, including application of retardant, will be employed for protection of life, property, or vulnerable cultural resources, or at the discretion of the IC after consultation with the Area Manager or Reclamation's Resource Advisor.
- All fire suppression personnel operating within the FMU will be briefed regarding known hazards, LCES, current and predicted weather, and current fire behavior by the IC.
- MIST will be employed to ensure protection of cultural sites and features. A map of "special areas of concern," if appropriate, will be made readily available in the respective agency resource offices for use of suppression resources.
- Mechanical hazard reduction will be applied to create defensible space and reduce potential intensities.

3. FMU III

All wildland fires, regardless of ignition source, will receive prompt suppression action commensurate with human safety and need. Minimum impact suppression tactics will be used except when human life or property is in imminent danger and then an aggressive approach will be pursued.

Constrictions to suppression include the non-use of using heavy equipment in riparian areas unless approved by the Resource Advisor on a case-by-case basis.

The landscape supports a complex pattern of open areas, grasslands, chamise chaparral, and oak woodlands. There is not a large accumulation of understory debris; however, this may increase in the future. The presence of highly combustible plants such as chamise, sagebrush, and thistles may result in a highly intensive and fast-spreading wildfire, should one occur.

Constraints for FMU III

Access to the terrain south of FMU I is via a locked gate and an unmaintained county road. Access may also be from the east via Fruto. Use of helitak and bucket drops is advisable in this FMU.

Procedures for FMU III:

- All fire-management-related activities will be based on safety of personnel and the public as the highest priority.
- Dozers and other heavy equipment are allowed when life, property, and/or historic properties are at risk.
- Low-level aircraft use, including application of retardant, will be employed for protection of life, property, or vulnerable cultural resources. This will be at the discretion of the IC after consultation with the Area Manager or Reclamation's Resource Advisor.
- All fire suppression personnel operating within the FMU will be briefed regarding known hazards, LCES, current and predicted weather, and current fire behavior by the IC.
- MIST will be employed to ensure protection of cultural sites and features. A map of "special areas of concern," if appropriate, will be made readily available in the respective agency resource offices for use of suppression resources.
- Mechanical hazard reduction will be applied to create defensible space and reduce potential intensities.

B. Prescribed Fire—any prescribed fires will be conducted following specific measures outlined in individual burn plans. See Section II.

1. FMU I

Prescribed fires are not expected to occur in this FMU except for pile burning of fuel reduction byproducts or broadcast burning for weed management.

Procedures for FMU I:

- All fire-management-related activities will be based on safety of personnel and the public as the highest priority. Only trained and qualified personnel will participate in the actual fire treatment.
- Apply best available management measures when mitigating for smoke impacts from prescribed fire.
- Dozers and other heavy equipment are allowed with a Resource Advisor's permission when life, property, and/or historic properties are at risk.

- The Regional archeologist will be kept informed on non-fire project(s) where on-site mitigation may be required and for fires and prescribed burns.
- Low-level aircraft use, including application of retardant, will be employed for protection of life, property, or vulnerable cultural resources, or at the discretion of the IC after consultation with the Area Manager or Reclamation's Resource Advisor.
- All fire suppression personnel operating within the FMU will be briefed regarding known hazards, LCES, current and predicted weather, and current fire behavior by the IC.
- MIST will be employed to ensure protection of cultural sites and features. A map of "special areas of concern," if appropriate, will be made readily available in the respective agency resource offices for use of suppression resources.
- Mechanical hazard reduction will be applied to create defensible space and reduce potential intensities.

2. FMU II

Prescribed fires are not expected to be conducted in this FMU except for possible pile burning or broadcast burning for weed control.

Constraints

Prescribed fires will be contained so they do not affect the non-project riparian areas. No prescribed fires will occur during the bald eagle nesting season. The desired time to burn would be December through February.

Procedures for FMU II:

- All fire-management-related activities will be based on safety of personnel and the public as the highest priority. Only trained and qualified personnel will participate in the actual fire treatment.
- Apply best available management measures when mitigating for smoke impacts from prescribed fire.
- Dozers and other heavy equipment are allowed with a Resource Advisor's permission when life, property, and/or historic properties are at risk.
- The Regional archeologist will be kept informed on non-fire project(s) where on-site mitigation may be required and for fires and prescribed burns.

- Low-level aircraft use, including application of retardant, will be employed for protection of life, property, or vulnerable cultural resources, or at the discretion of the IC after consultation with the Area Manager or Reclamation's Resource Advisor.
- All fire suppression personnel operating within the FMU will be briefed regarding known hazards, LCES, current and predicted weather, and current fire behavior by the IC.
- MIST will be employed to ensure protection of cultural sites and features. A map of "special areas of concern," if appropriate, will be made readily available in the respective agency resource offices for use of suppression resources.
- Mechanical hazard reduction will be applied to create defensible space and reduce potential intensities.

3. FMU III

Prescribed fires are not expected to be conducted in this FMU except for possible pile burning or broadcast burning for weed control.

Constraints

Prescribed fires will be contained so they do not affect the non-project riparian areas. The desired time to burn would be December through February.

Procedures for FMU III:

- All fire-management-related activities will be based on safety of personnel and the public as the highest priority. Only trained and qualified personnel will participate in the actual fire treatment.
- Apply best available management measures when mitigating for smoke impacts from prescribed fire.
- Dozers and other heavy equipment are allowed with a Resource Advisor's permission when life, property, and/or historic properties are at risk.
- The Regional archeologist will be kept informed on non-fire project(s) where on-site mitigation may be required and for fires and prescribed burns.
- Low-level aircraft use, including application of retardant, will be employed for protection of life, property, or vulnerable cultural resources, or at the discretion of the IC after consultation with the Area Manager or Reclamation's Resource Advisor.

- All fire suppression personnel operating within the FMU will be briefed regarding known hazards, LCES, current and predicted weather, and current fire behavior by the IC.
- MIST will be employed to ensure protection of cultural sites and features. A map of "special areas of concern," if appropriate, will be made readily available in the respective agency resource offices for use of suppression resources.
- Mechanical hazard reduction will be applied to create defensible space and reduce potential intensities.

C. Non-Fire Fuels Treatments

1. FMU I

- Biological. There is no lease issued for cattle grazing in this FMU but can be issued in the future on approximately 150 acres (which excludes the dam area). Any grazing should be managed according to recommendations made by resource staff once proper boundary and other fencing is installed and/or improved. There has been trespassing by cattle frequently observed.
- Mechanical/Chemical. Manual control (mowing) of invasive weed species such as thistle and medusahead may occur, as well as future use of cattle or goats. Weeds are sprayed on approximately 10 acres in the campground areas each spring.

2. FMU II

- Biological. Cattle grazing occurs in this FMU on approximately 363 acres year-round (according to an annual lease for grazing issued by Reclamation, lease states the acreage is 740 acres). Cattle have been used as a tool to reduce weed mass and fuel load.
- Mechanical/Chemical. Manual control is not used in this FMU because of poor access (access is predominately by boat). Use of herbicides is not currently done but could be considered in the future for areas of rampant invasive weed species. Future use of cattle or goat grazing should be considered.

3. FMU III

- Biological. Cattle grazing may occur in this FMU in the future once fencing is constructed and/or repaired on approximately 570 acres according to recommendations provided by the resource staff. There is currently no lease issued for cattle grazing although trespassing by cattle is frequent.

- Mechanical/Chemical. Manual control is not currently used in this area due to poor access (predominantly by boat). Use of herbicides is not currently done but could be considered in the future for areas of rampant invasive weed species. Future use of cattle or goat grazing should be considered.

D. Post Fire Rehabilitation

Should habitat rehabilitation be necessary following a fire occurrence, appropriate erosion control/reseeding efforts will be pursued on the advice of the Resource Advisor, pending availability of funds. A summary of the fire management components is summarized in Table 3.

Table 3. Summary of Fire Management Components

Objectives for the Stony Gorge Reservoir Fire Management Units		
FMU I (north)	FMU II (west)	FMU III (east)
@3 acres of wetland and riparian areas @ 255 acres of upland	@ 363 acres of upland	@3 acres of wetlands and riparian @ 567 acres of upland
<p>1. Fire Suppression</p> <p>Suppression on all acres of any natural or human-caused wildfires as quickly as possible by CAL FIRE, using MIST. No heavy equipment or use of retardant in lake or riparian areas unless life and property are threatened or approved on-site by a Resource Advisor.</p> <p>2. Prescribed Burns*</p> <p>Planned burns to reduce the fuel load and control invasive weeds.</p> <p>3. Non-Fire Fuel Treatments</p> <p>a. <u>Biological Control</u> Future limited cattle grazing according to resource staff recommendations.</p> <p>b. <u>Mechanical/Chemical Treatment</u> Current herbicide use in recreation areas. Herbicide use and grazing by cattle or goats can be expanded to upland areas.</p>	<p>1. Fire Suppression</p> <p>Suppression on all acres of any natural or human-caused wildfires as quickly as possible by CAL FIRE, using MIST. No retardants in sensitive areas (eagle nest) unless approved on-site by a Resource Advisor.</p> <p>2. Prescribed Burns*</p> <p>Planned burns to reduce the fuel load and control invasive weeds.</p> <p>3. Non-Fire Fuel Treatments</p> <p>a. <u>Biological Control</u> Annual year-round cattle grazing.</p> <p>b. <u>Mechanical/Chemical Treatment</u> Potential future use of herbicides, cattle or goat grazing.</p>	<p>1. Fire Suppression</p> <p>Suppression on all acres of any natural or human-caused wildfires as quickly as possible by CAL FIRE using MIST. No heavy equipment or use of retardant in lake or riparian areas (below dam) or in sensitive areas unless life and property are threatened or approved on-site by a Resource Advisor.</p> <p>2. Prescribed Burns*</p> <p>Planned burns to reduce the fuel load and control invasive weeds</p> <p>3.Non-Fire Fuel Treatments</p> <p>a. <u>Biological Control</u> Future cattle grazing according to resource staff recommendations.</p> <p>b. <u>Mechanical/Chemical Treatment</u> Potential future use of herbicides, cattle or goat grazing.</p>

4. Post-Fire Rehabilitation Emergency Stabilization and Rehabilitation Policy will be used as outlined in the DOI Department Manual 620 DM 3.	4. Post-Fire Rehabilitation Emergency Stabilization and Rehabilitation Policy will be used as outlined in the DOI Department Manual 620 DM 3.	4. Post-Fire Rehabilitation Emergency Stabilization and Rehabilitation Policy will be used as outlined in the DOI Department Manual 620 DM 3.
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* Any burns or mechanical treatment will be conducted at the time of year and in a manner as to not disturb bald eagle nesting and deer calving.

VII. Organization and Budget

Due to appropriation differences from most other Department agencies, Reclamation currently has no specific wildland fire or fuels budget. Fire suppression and prescribed fire or other fuels treatment activities are currently funded by the area offices' operating budgets.

Reclamation currently has one full-time fire management position in the Mid-Pacific Region. This is the Regional Wildland Fire Management Officer (FMO) based in the Regional Office in Sacramento. Currently, no full-time fire management positions are staffed in the area offices. Collateral positions such as FMO, Fire Coordinator, or Resource Advisor may be staffed as needed by qualified individuals at the area office level. CAL FIRE provides the wildland fire suppression organization by agreement with Reclamation. The U.S. Fish and Wildlife Service and the NPS provide prescribed burn assistance services through interagency agreements.

VIII. Monitoring and Evaluation

The area office manager is responsible for ensuring that the FMP is implemented as planned and whether fire-related goals and objectives are being achieved. The area office manager will assign staff responsible for monitoring and evaluating the FMP for periodic updates.

References

1. CDEC, 2006. California Data Exchange Center. <http://cdec.water.ca.gov/>
2. Rodrigue, Christine M. 1993. Home with a view: Chaparral fire hazard and the social geographies of risk and vulnerability. *The California Geographer* 33:29-42.
3. U.C. Davis, 2005. Quail Ridge Reserve, Human History - The Patwin
4. Williams, 1994. REFERENCES ON THE AMERICAN INDIAN USE OF FIRE IN ECOSYSTEMS. Gerald W. Williams, Ph.D. August 23.

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